

Zero Retries issue 0069 2022-10-21

Zero Retries is an independent email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience. It's free (as in beer) to subscribe.

About Zero Retries

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Request To Send

Finding The Mission

It took a while for Zero Retries to “find its mission”, which has gradually developed to be highlighting Technological Innovation In Amateur Radio. When I began Zero Retries, it wasn’t in service of “a mission”, but rather address that (in my opinion) there wasn’t enough discussion and recognition of the technological innovation that was happening in Amateur Radio. As Zero Retries... and my “deeper thinking” about Amateur Radio has evolved, I’ve developed a perspective that Amateur Radio as a research and development environment for developing new radio technology, especially by talented individuals with an interesting idea, is the best justification for the continued allocation of portions of spectrum to the semi-exclusive use of those licensed as Amateur Radio Operators.

Using Amateur Radio to foster technological innovation in radio technology is woefully under-explained to the public. Zero Retries (as currently constituted as a hobby project) isn’t capable of explaining “Technological Innovation in Amateur Radio” to the public. But, such “evangelism” has to start somewhere. Zero Retries, and my [SuperPacket Blog](#) are at least *something*, and they’re both reasonably discoverable if someone cares to come looking for examples of Technological Innovation In Amateur Radio.

However, I think there’s some potential for those of us who believe in [effectively](#) evangelizing the technological innovation in Amateur Radio to share ideas and cross fertilize. A great example is a recent YouTube video by Andreas Spiess HB9BLA - **Overview for the Modern, Digital HAM Radio Operator (Hamnet, AREDN, Lora, etc.)**:

HB9BLA effectively explains the bigger picture of how many of the “new paradigm” Amateur Radio activities such as Hamnet, AREDN, Packet Radio, and several others all can interoperate.

In 2023, evangelism for Amateur Radio will be a more prominent part of Zero Retries.

Amateur Radio Fun

But then... there's the fun. For me, being an Amateur Radio Operator has always been mostly about learning and experimentation, especially data communications over radio. I'm constantly delighted at seeing the projects of other Amateur Radio Operators. Amateur Radio is different for others - communications with other Amateur Radio operators, providing emergency communications, a sport of sorts, etc.

I can't explain why I've always been fascinated with combining radio communications with data communications, and *why* it remains endlessly fascinating to me, multiple decades after I discovered Amateur Radio Packet Radio. Even though we have pocket supercomputers with gigabit wireless communications, I remain interested in how much one can *do* with “radio”... versus “wireless” technology.

Amateur Radio is special because when you become licensed, you quite literally *have a license to experiment with radio technology*. You can build new radios and systems and try them out on the air. There's ample spectrum in our VHF / UHF / SHF bands to try new things. You can't say that about other “hobby” radio services, at least in the US. Experimentation in those other services is discouraged or even outright prohibited. Citizens Band (CB), Family Radio Service (FRS), General Mobile Radio Service (GMRS), even “Multiple Use Radio Service” (MURS) all have restrictive rules about what you can and cannot do and require “built for purpose” radios to be used. Not so with Amateur Radio - it's a playground for those of us curious and interested in experimenting with radio technology.

Don't get me wrong - “wireless” technology - mobile phones and their corresponding networks, Wi-Fi and similar technologies, even satellite communications are all interesting and of course incredibly useful. But, none of those interest me to the point of spending “hobby money” and “hobby time” on them (other than the exception of Starlink, as explained in Zero Retries 0068).



Image courtesy of DigiBarn Computer Museum

This ongoing fascination of the combination of Amateur Radio and personal computers probably relates to the personal computer revolution that was launched with the [MITS Altair 8800](#) in the January 1975 issue of Popular Electronics in my formative teenage years. Before then, a “personal computer” was either a toy, or a serious investment to buy a surplus industrial minicomputer. After January 1975, an individual owning and using a computer was not only possible, but reasonably practical (for those of us unafraid of electronics and associated technologies such as programming). I was a 15 year old subscriber to Popular Electronics, with the subscription paid for with paper route money. Sometime in late December 1974, I walked out to the mailbox at the curb, and there was that magical issue of Popular Electronics. That moment is crystalized in my memory - I remember everything about that moment, including that I stood in wet slush soaking into my shoes for minutes as I began to read the article. As I read, and reread that article, I knew my world would never be the same. Three years later I began my studies to become an Electronic Technician, which included machine language programming, timeshared between eight dumb terminals, on one of the same computers that I saw on the cover of the January 1975 issue of Popular Electronics.

Combining personal computers, with radio communications... well, that was magical to me. Even after the rise of dialup Bulletin Board Systems (BBS’), and networks such as FidoNet, then ARPANet, and eventually the Internet... personal computers plus radio communications still remained fascinating to me.

I guess that is a functional definition of a hobby - something you spend time, money, effort, energy, and thought about, but has no significant commercial or professional benefit. You devote those personal resources on a hobby because it’s fun - to you. If you’re lucky, you get to share that fun with others. With all you Zero Retries readers sharing my fun of endless discovery about Amateur Radio and data communications, satellites,

microwave communications, all of that... I'm blessed to have you all along for the ride.

de Steve N8GNJ

ARDC Is Looking For A Few Good People

I mentioned in Zero Retries 0068:

ARDC is looking for new folks for their [2023 Grants Advisory Committee](#) (GAC). Note that an Amateur Radio license is not a requirement.

See the link for ARDC's requested qualifications.

ARDC is also looking for new folks for their [2023 Technical Advisory Committee](#) (TAC). Unlike the call for volunteers for the GAC, the call for volunteers for the TAC doesn't list requested qualifications.

The deadline for applying for both the GAC and the TAC is 2022-11-12.

If you decide to apply to the ARDC GAC or TAC, please mention you heard about it in Zero Retries.

An Embarrassment of ID-1s

A longtime Zero Retries subscriber recently told me "The stories I enjoy most in Zero Retries are about what you've done, rather than what you think, or what you hope to do". Point taken, and I'll try to do more of that. Until then, enjoy this slightly strange story.

What do you call a group of bats? *A cauldron*. A group of eagles? *A convocation*.² Thus, I felt it was appropriate to create a name for my recently enlarged collection of Icom ID-1 radios - *an embarrassment*.



I readily confess to an affection for the [Icom ID-1](#). I attended the Digital Communications Conference (2001, if memory serves) where engineers from Icom Japan unveiled the prototype of the ID-1 as the first unit of the eventual D-Star product line. At the time, there was progress being made in higher speed Amateur Radio data communications, and thus the ID-1 had great promise as it was a standalone data (and analog / digital voice)

radio that was capable of “128 kbps” and the interface for that data capability was an Ethernet jack (still a bit exotic in Amateur Radio in 2001). In my memory, the ID-1 was the first commercial “black box” Amateur Radio unit that didn’t actually need a sexy, but expensive and unnecessary control panel - all functions could be configured via the USB port (using Icom’s ID-1 software for Windows).

My memory is that the contingent from Icom was a bit shocked at the “not uncritical” reception it received from the [netheads](#) in attendance at that DCC. “Why did you do *this*? Why didn’t you include *that*? It didn’t *need* a microphone, or control head! Etc. (We American techies aren’t very graceful / tactful at times.)

Unfortunately, the ID-1 had a lot of issues such as no TCP/IP stack (it was, essentially, an Ethernet-to-Radio bridge), operated only on the 1240-1300 MHz band, the companion repeater wasn’t easily networked via Internet, 10 watt output, etc. But the biggest issue with the ID-1 was that it was expensive - as I recall, it was nearly \$1000, though there were efforts to lower the price such as offering a unit that didn’t include the control head.

Icom discontinued the ID-1 a few years ago, but the ID-1’s “Digital Data” mode (128 kbps data on 1240 - 1300 MHz band) has been continued in the new Icom [ID-RP1200VD](#) repeater, as a mode of the [IC-9700](#) radio, and (remains to be seen) a mode of the announced [IC-905](#) radio.

There’s ample evidence that ID-1s work well within their design constraints. There are still Digital Data (DD) networks / repeaters in a number of areas (discussed in Zero Retries 0009 - **Create an Equivalent of the Icom ID-1 Radio Using 2021 Technology**).

Present Day

Within the product lifetime of the ID-1, I was a family guy, “self employed” (aka, broke) for a while, with a mortgage. Thus buying a new ID-1, let alone a pair to experiment with just wasn’t within my means. But present day as retired, no mortgage, and my daughter delightfully self-sufficient, when used ID-1s began showing up on eBay at prices I considered reasonable, I was finally able to own a few ID-1s for personal experimentation.

Last week, I received an unexpected email mentioning that a few ID-1s were available for sale, and was I interested? I explained that while the prices were reasonable, I already had a few for personal experimentation and the price I’d be willing to pay (given that I already had some units) was significantly less than the “asking” price. They asked what I would be willing to pay, and I named my (much lower) price, and to my shock, they agreed and I picked up several more ID-1s last Saturday.

Thus, now I have an embarrassment of Icom ID-1s for experimentation in the coming months. Here are some of my thoughts on what I hope to do with them:

- Now that I have enough units, I could build a repeater out of two units. I haven’t checked out the new Icom [ID-RP1200VD](#) repeater, but the (previous) Icom [IC-RP2D](#) operated half-duplex, thus it was more like a dual-frequency digipeater. From what I read and was told, the original “DD” repeater waited until an entire frame was received, then retransmitted it on a different frequency. Thus much of the potential throughput was wasted. The [Westcoast Amateur Radio Association \(WARA\)](#) in nearby (just a ferry ride...) Victoria, British Columbia once built a DD mode reperepeater from two ID-1s that was claimed to perform much better (full duplex!) than the Icom IC-RP2D repeater. As I write this, I cannot find a reference to that system, but I’ve [put out some queries](#).
- Because the ID-1 has no TCP/IP stack, if you wanted to use TCP/IP through an ID-1, you needed to “slave” a computer to it to handle the TCP/IP functions. Back then, that was a PC. Now, all that’s required is a \$35 Raspberry Pi3. Hopefully the Raspberry Pi can also handle the management of the radio - frequency changes, etc. that Icom intended to be done with a Windows computer and Windows software.
- In nearby Victoria and Vancouver British Columbia there are some 1240 - 1300 MHz D-Star repeaters, both Digital Voice (DV) and Digital Data (DD) and it will be fun to try to work those repeaters. At 10 watts, a highly directional yagi antenna will probably be required to hit those repeaters from Bellingham, Washington. Fortunately, the repeaters are on mountains.

- Ultimately I'd like to build up the ID-1s to act as a small, higher speed network; set each one up so that you only need to connect power and antenna. The data connection would be Ethernet (would require a small Ethernet switch) or Wi-Fi.
- Some research would be needed on how to configure the applications software to use the ID-1s as "default gateway".
- A lot of the capabilities of the ID-1s are nearly lost to history. Solutions for the ID-1's deficiencies were developed, implemented, but rarely written down and made widely available, especially online. Thus a lot of what I discover (rediscover) will make for some fun to document into some extensive documentation.
- Ultimately, it would be useful to create a functional specification of the ID-1 and DD mode. It was a "successful" product in that it made it to production, it was offered for sale, it was purchased by users, put into service, and was generally reliable given its constraints.

As I said in Request to Send above - **Amateur Radio Fun!**

The ARRL Handbook for Radio Communications - 100th Edition



Image courtesy of ARRL

To commemorate this special edition, a **collector's edition** of Handbook 100 is strikingly hardbound in a textured black finish with silver foil embossing. The collector's edition includes a special insert looking back across decades of content that built The Handbook's reputation as a "must-have" for the radio experimenter. This special section celebrates The Handbook's evolution across decades of technological innovation and growth of ham radio. It's a retrospective told through previous edition covers and pages.

[Now on sale!](#) The 100th edition of the ARRL Handbook - that is a *milestone* in publishing. The hardback includes both the "Windows" and the "Mac / Linux" electronic versions. *This* is one (or two) that will have a prominent place on my Amateur Radio bookshelf. Zero Retries readers will probably be interested in Chapter 15 - Digital Protocols and Modes. See the [Table of Contents](#) for how comprehensive this edition is.

I'm on record as criticizing ARRL (and other organizations) for restricting access to their periodical content

(magazines, newsletters) behind a paywall, especially when part of their mission includes trying to make Amateur Radio relevant to the current generation that expects unrestricted access to information. That said, I am not critical of ARRL and other organizations / authors charging for books, especially substantive reference books like this. There's an incredible amount of work that goes into such books (I know...), and I have no problem paying for such books.

ZR > BEACON

- **HAARP to begin largest set of experiments at its new observatory**

[University of Alaska Fairbanks article](#):

Bouncing a signal off the moon.

Learning more about a mysterious polar light.

Sending a beam to Jupiter.

Those are just some of the 13 experiments for a packed 10 days of science beginning Wednesday at the High-frequency Active Auroral Research Program. The University of Alaska Fairbanks operates the facility located near Gakona.

[ARRL Letter article](#):

The High-frequency Active Auroral Research Program (HAARP) will be conducting their largest experiment and research campaign from October 19 - 28, 2022. Amateur radio operators are invited to listen and participate.

The research will last for 10 days and include 13 experiments, with transmissions taking place between 1400 - 0600 UTC daily. The transmission experiments include moon bounce, Jupiter bounce, HF ocean scatter, and ionosphere satellite interactions. Amateur radio operators are being asked to monitor the times of the transmissions and signal quality. Reports can be filed electronically, and a special QSL card will be sent for participation.

- [POE Splitter for Raspberry Pi](#) - This seems a useful device for powering a Raspberry Pi (including Raspberry Pi Zero) remotely via the Ethernet cable. While there is an [official Raspberry Pi Power Over Ethernet adapter](#), it adds height and a (noisy?) fan to an otherwise compact and silent Raspberry Pi. My thanks to Steve Davidson K3FZT for the pointer to this.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing *Thanks* to:

- Tina Stroh KD7WSF for, well, *everything*!

- Pseudostaffer [Dan Romanchik KB6NU](#) for continuing to spot, and write about “Zero Retries Interesting” items on his blog that I don’t spot on my own.
- [Amateur Radio Weekly](#) and [Southgate Amateur Radio News](#) consistently surface “Zero Retries Interesting” stories.
- The [Substack email publishing platform](#) makes Zero Retries possible. I recommend it for publishing newsletters.

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More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted in beautiful Bellingham, Washington, USA

2022-10-21

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Blanket permission granted for TAPR to use any Steve Stroh content for the TAPR Packet Status Register (PSR) newsletter (I owe them from way back).

[1](#)

The definition of “Effectively” evangelizing Amateur Radio is hazily defined at best.

2

My thanks to this great article by Alex Lockie - [The 34 oddest names for groups of animals](#).

3

Yes, I know they're hard to get in late 2022. That situation won't last forever, and I have a small stash of Raspberry Pi computers, including some earlier than the Raspberry Pi 3B+ that would work fine for this minimal task.